



wwPDB X-ray Structure Validation Summary Report ⓘ

May 15, 2020 – 12:52 pm BST

PDB ID : 4GAW
Title : Crystal structure of active human granzyme H
Authors : Wang, L.; Li, Q.; Wu, L.; Zhang, K.; Tong, L.; Sun, F.; Fan, Z.
Deposited on : 2012-07-25
Resolution : 3.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

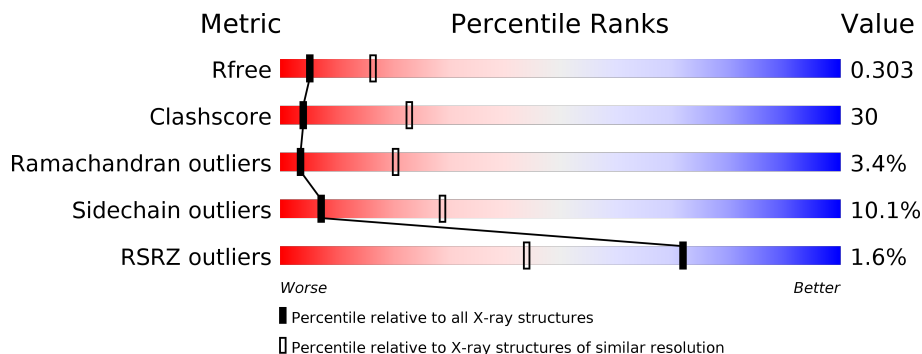
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.




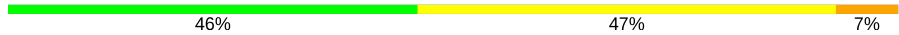
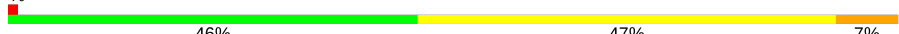
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	226	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 34%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 54%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 9%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">4% 34% 54% 9% ..</p>
1	B	226	<div style="display: flex; align-items: center;"> <div style="width: 49%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 41%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: orange; margin-right: 5px;"></div> </div> <p style="text-align: center;">49% 41% 10%</p>
1	C	226	<div style="display: flex; align-items: center;"> <div style="width: 45%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 48%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 8%; height: 10px; background-color: orange; margin-right: 5px;"></div> </div> <p style="text-align: center;">45% 48% 8%</p>
1	D	226	<div style="display: flex; align-items: center;"> <div style="width: 46%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 47%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red; margin-right: 5px;"></div> </div> <p style="text-align: center;">46% 47% 6% .</p>
1	E	226	<div style="display: flex; align-items: center;"> <div style="width: 52%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 42%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red; margin-right: 5px;"></div> </div> <p style="text-align: center;">52% 42% ..</p>
1	F	226	<div style="display: flex; align-items: center;"> <div style="width: 53%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 38%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 8%; height: 10px; background-color: orange; margin-right: 5px;"></div> </div> <p style="text-align: center;">53% 38% 8%</p>

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Mol	Chain	Length	Quality of chain
1	G	226	
1	H	226	
1	I	226	
1	J	226	
1	K	226	
1	L	226	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	SO4	L	301	-	-	X	-
2	SO4	L	302	-	-	-	X

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 21292 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Granzyme H.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	224	1754	1115	321	307	11	0	0	0
1	B	226	1769	1124	324	310	11	0	0	0
1	C	226	1769	1124	324	310	11	0	0	0
1	D	226	1769	1124	324	310	11	0	0	0
1	E	226	1769	1124	324	310	11	0	0	0
1	F	226	1769	1124	324	310	11	0	0	0
1	G	226	1769	1124	324	310	11	0	0	0
1	H	221	1732	1101	317	303	11	0	0	0
1	I	226	1769	1124	324	310	11	0	0	0
1	J	226	1769	1124	324	310	11	0	0	0
1	K	226	1769	1124	324	310	11	0	0	0
1	L	226	1769	1124	324	310	11	0	0	0

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	I	1	Total	O	S	0	0
			5	4	1		
2	I	1	Total	O	S	0	0
			5	4	1		
2	L	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	L	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	I	1	Total	Cl	0	0
			1	1		
3	D	1	Total	Cl	0	0
			1	1		
3	C	1	Total	Cl	0	0
			1	1		

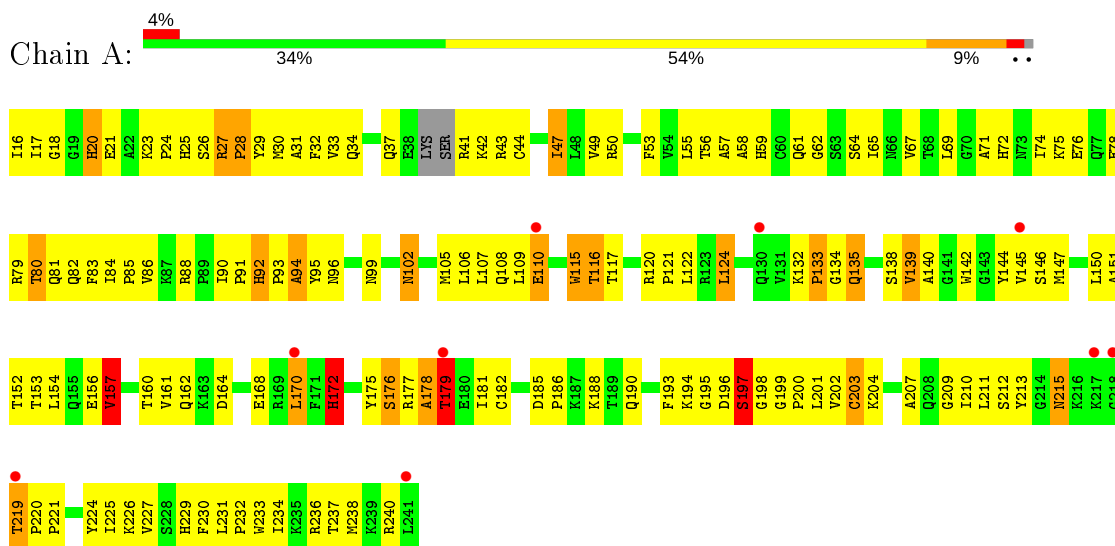
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	4	Total	O	0	0
			4	4		
4	B	3	Total	O	0	0
			3	3		
4	D	6	Total	O	0	0
			6	6		
4	E	4	Total	O	0	0
			4	4		
4	F	4	Total	O	0	0
			4	4		
4	G	1	Total	O	0	0
			1	1		
4	H	1	Total	O	0	0
			1	1		
4	I	8	Total	O	0	0
			8	8		
4	J	1	Total	O	0	0
			1	1		
4	K	2	Total	O	0	0
			2	2		
4	L	4	Total	O	0	0
			4	4		

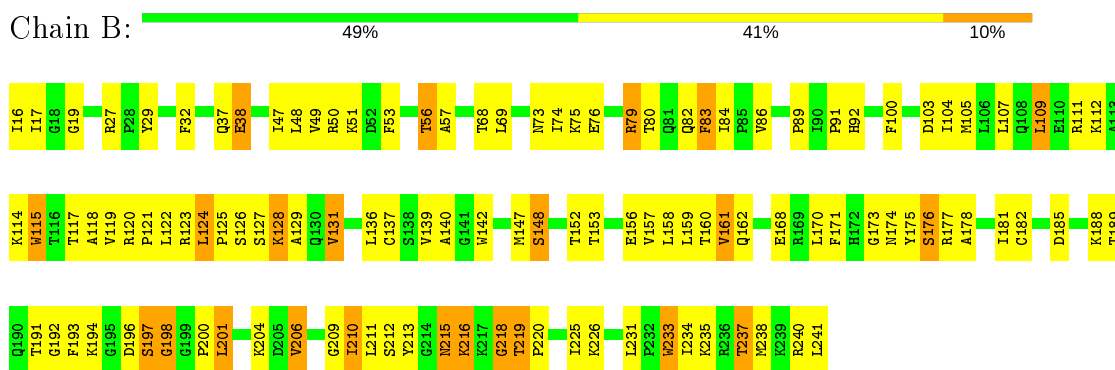
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

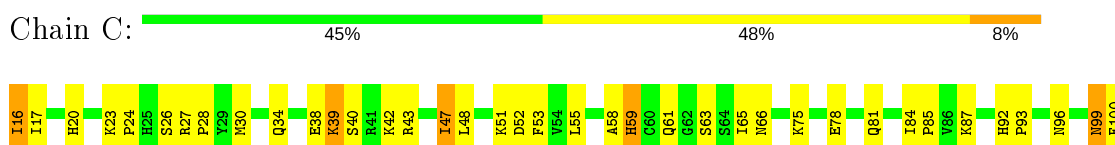
- Molecule 1: Granzyme H

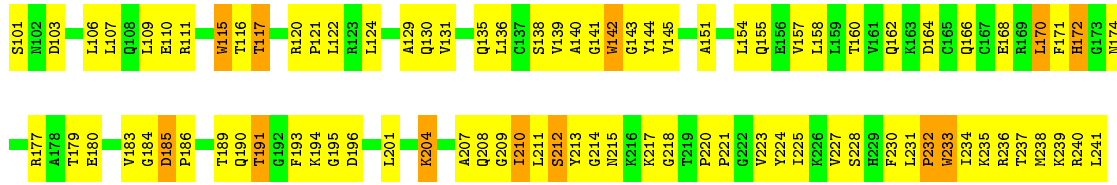


- Molecule 1: Granzyme H

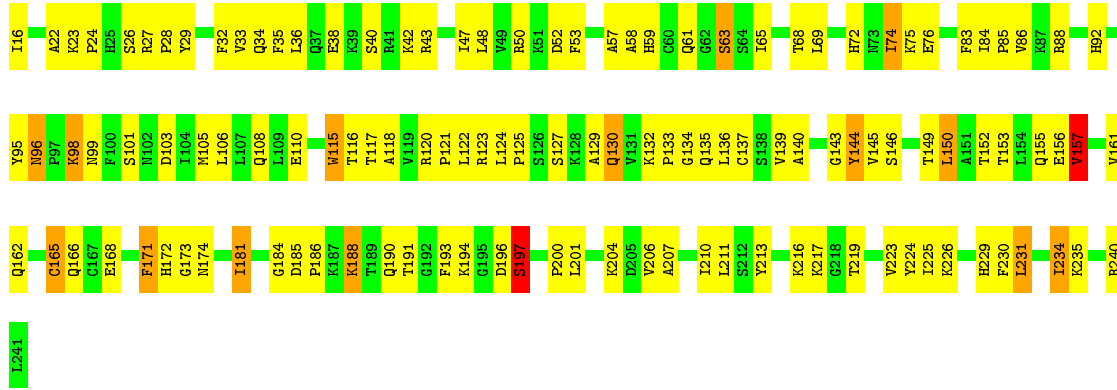


- Molecule 1: Granzyme H

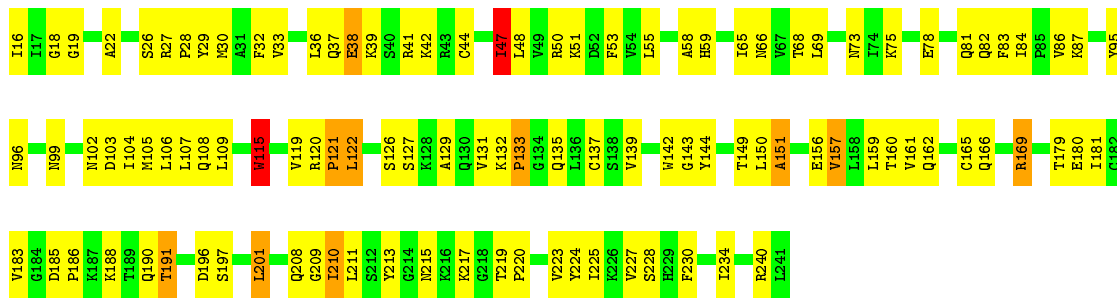




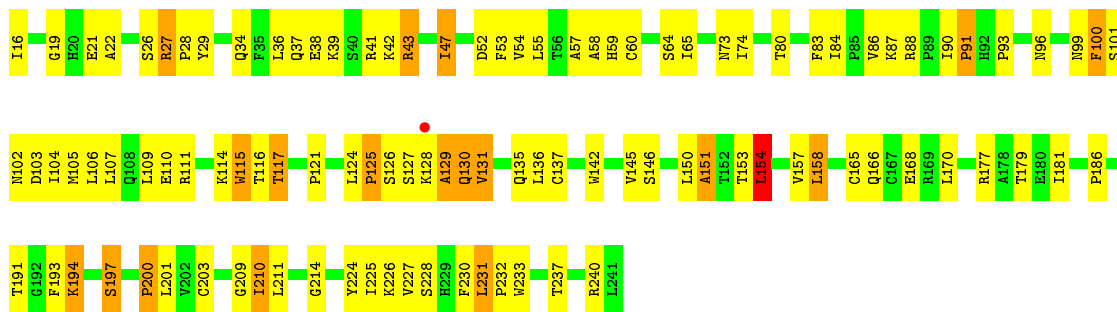
• Molecule 1: Granzyme H



• Molecule 1: Granzyme H

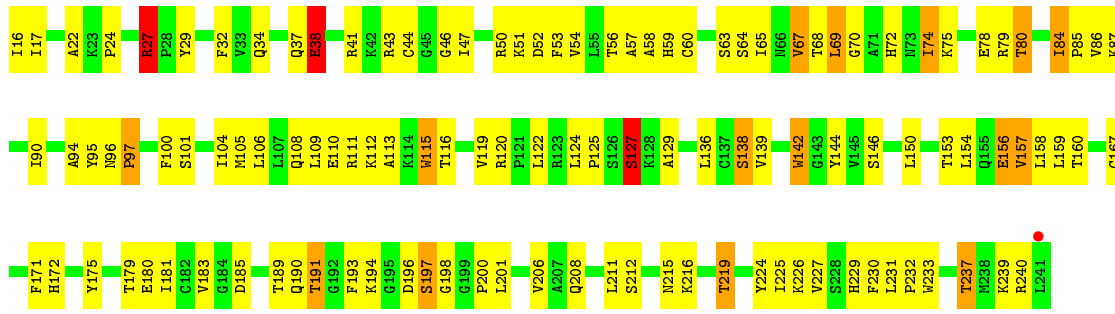


• Molecule 1: Granzyme H



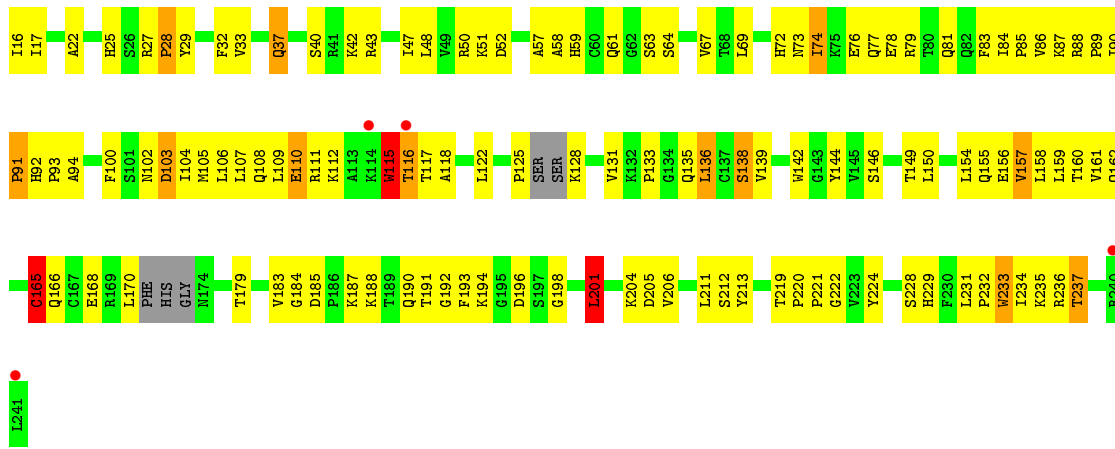
• Molecule 1: Granzyme H

Chain G: 47% 45% 7%



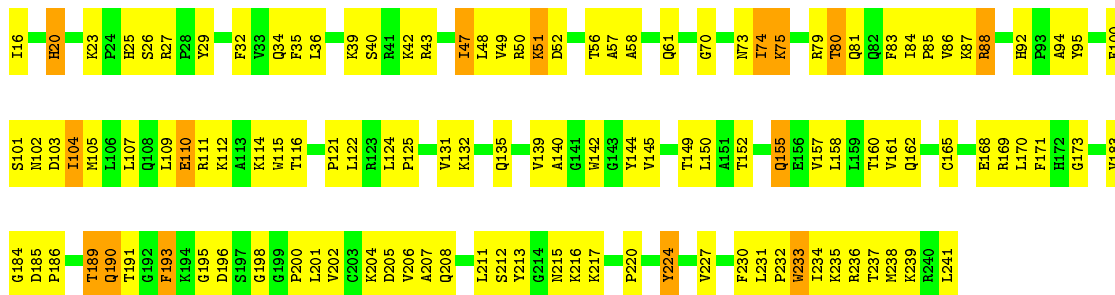
• Molecule 1: Granzyme H

Chain H: 43% 48% 5%



• Molecule 1: Granzyme H

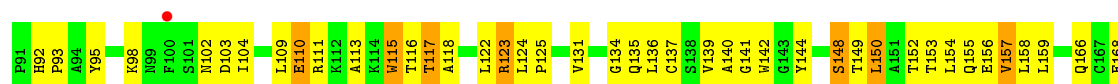
Chain I: 46% 47% 7%



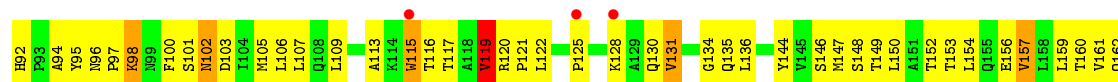
• Molecule 1: Granzyme H

Chain J: 46% 47% 7%

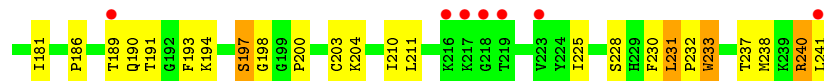
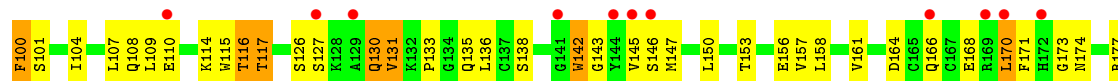
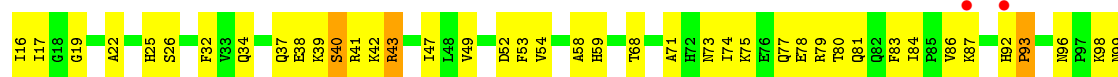




• Molecule 1: Granzyme H



• Molecule 1: Granzyme H



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	170.37Å 367.07Å 61.14Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.80 – 3.00 39.80 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.8 (39.80-3.00) 99.9 (39.80-3.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.48 (at 3.01Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.271 , 0.306 0.270 , 0.303	Depositor DCC
R_{free} test set	3929 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	55.3	Xtrriage
Anisotropy	0.065	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 44.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	21292	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 45.77 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.2609e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.70	2/1794 (0.1%)	0.85	1/2420 (0.0%)
1	B	0.82	2/1810 (0.1%)	0.98	3/2442 (0.1%)
1	C	0.71	2/1810 (0.1%)	0.92	2/2442 (0.1%)
1	D	0.75	1/1810 (0.1%)	0.90	0/2442
1	E	0.70	2/1810 (0.1%)	0.90	2/2442 (0.1%)
1	F	0.84	1/1810 (0.1%)	1.01	4/2442 (0.2%)
1	G	0.77	2/1810 (0.1%)	0.89	2/2442 (0.1%)
1	H	0.63	2/1769 (0.1%)	0.83	2/2384 (0.1%)
1	I	0.75	3/1810 (0.2%)	0.90	0/2442
1	J	0.63	1/1810 (0.1%)	0.80	1/2442 (0.0%)
1	K	0.54	1/1810 (0.1%)	0.75	1/2442 (0.0%)
1	L	0.66	3/1810 (0.2%)	0.79	2/2442 (0.1%)
All	All	0.71	22/21663 (0.1%)	0.88	20/29224 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	2
1	G	0	1
All	All	0	4

The worst 5 of 22 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	142	TRP	CD2-CE2	6.56	1.49	1.41
1	F	115	TRP	CD2-CE2	6.51	1.49	1.41
1	G	115	TRP	CD2-CE2	6.47	1.49	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	233	TRP	CD2-CE2	6.01	1.48	1.41
1	L	115	TRP	CD2-CE2	5.94	1.48	1.41

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	198	GLY	N-CA-C	-6.93	95.77	113.10
1	K	48	LEU	CA-CB-CG	6.30	129.80	115.30
1	C	214	GLY	N-CA-C	-6.24	97.51	113.10
1	E	122	LEU	CA-CB-CG	6.16	129.46	115.30
1	L	158	LEU	CA-CB-CG	6.13	129.41	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	215	ASN	Peptide
1	B	126	SER	Peptide
1	B	197	SER	Peptide
1	G	127	SER	Peptide

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1754	0	1798	155	2
1	B	1769	0	1817	122	0
1	C	1769	0	1817	111	0
1	D	1769	0	1817	101	0
1	E	1769	0	1817	96	0
1	F	1769	0	1817	94	0
1	G	1769	0	1817	94	0
1	H	1732	0	1786	108	0
1	I	1769	0	1817	102	0
1	J	1769	0	1817	108	0
1	K	1769	0	1817	147	0
1	L	1769	0	1817	85	2

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	20	0	0	1	0
2	D	15	0	0	1	0
2	E	5	0	0	0	0
2	F	15	0	0	0	0
2	I	10	0	0	1	0
2	L	10	0	0	2	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	I	1	0	0	0	0
4	A	4	0	0	0	0
4	B	3	0	0	0	0
4	D	6	0	0	1	0
4	E	4	0	0	0	0
4	F	4	0	0	0	0
4	G	1	0	0	0	0
4	H	1	0	0	0	0
4	I	8	0	0	0	0
4	J	1	0	0	0	0
4	K	2	0	0	1	0
4	L	4	0	0	4	0
All	All	21292	0	21754	1282	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 30.

The worst 5 of 1282 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:233:TRP:O	1:B:237:THR:HG23	1.36	1.20
1:H:61:GLN:HE22	1:H:91:PRO:HG3	1.07	1.17
1:B:19:GLY:HA3	1:B:157:VAL:HG12	1.21	1.15
1:L:37:GLN:HG3	1:L:42:LYS:HE2	1.20	1.13
1:H:16:ILE:HG21	1:H:155:GLN:HB2	1.20	1.12

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:HIS:CE1	1:L:173:GLY:O[1_554]	1.68	0.52
1:A:172:HIS:ND1	1:L:173:GLY:O[1_554]	2.06	0.14

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	220/226 (97%)	167 (76%)	39 (18%)	14 (6%)	1	7
1	B	224/226 (99%)	196 (88%)	24 (11%)	4 (2%)	8	37
1	C	224/226 (99%)	185 (83%)	35 (16%)	4 (2%)	8	37
1	D	224/226 (99%)	183 (82%)	31 (14%)	10 (4%)	2	14
1	E	224/226 (99%)	193 (86%)	23 (10%)	8 (4%)	3	19
1	F	224/226 (99%)	190 (85%)	23 (10%)	11 (5%)	2	13
1	G	224/226 (99%)	187 (84%)	30 (13%)	7 (3%)	4	23
1	H	215/226 (95%)	181 (84%)	27 (13%)	7 (3%)	4	21
1	I	224/226 (99%)	192 (86%)	28 (12%)	4 (2%)	8	37
1	J	224/226 (99%)	187 (84%)	31 (14%)	6 (3%)	5	26
1	K	224/226 (99%)	183 (82%)	31 (14%)	10 (4%)	2	14
1	L	224/226 (99%)	192 (86%)	25 (11%)	7 (3%)	4	23
All	All	2675/2712 (99%)	2236 (84%)	347 (13%)	92 (3%)	3	20

5 of 92 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	94	ALA
1	A	172	HIS
1	A	177	ARG
1	D	240	ARG
1	E	191	THR

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	192/194 (99%)	166 (86%)	26 (14%)	4	17
1	B	194/194 (100%)	175 (90%)	19 (10%)	8	30
1	C	194/194 (100%)	174 (90%)	20 (10%)	7	28
1	D	194/194 (100%)	171 (88%)	23 (12%)	5	22
1	E	194/194 (100%)	179 (92%)	15 (8%)	13	42
1	F	194/194 (100%)	177 (91%)	17 (9%)	10	36
1	G	194/194 (100%)	173 (89%)	21 (11%)	6	26
1	H	190/194 (98%)	173 (91%)	17 (9%)	9	35
1	I	194/194 (100%)	173 (89%)	21 (11%)	6	26
1	J	194/194 (100%)	174 (90%)	20 (10%)	7	28
1	K	194/194 (100%)	177 (91%)	17 (9%)	10	36
1	L	194/194 (100%)	176 (91%)	18 (9%)	9	33
All	All	2322/2328 (100%)	2088 (90%)	234 (10%)	7	29

5 of 234 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	47	ILE
1	G	127	SER
1	L	25	HIS
1	F	91	PRO
1	F	228	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 39 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	208	GLN
1	E	190	GLN
1	K	102	ASN
1	E	108	GLN
1	E	135	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 3 are monoatomic - leaving 15 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	SO4	I	301	-	4,4,4	0.38	0	6,6,6	0.59	0
2	SO4	L	301	-	4,4,4	0.45	0	6,6,6	0.48	0
2	SO4	D	302	-	4,4,4	0.51	0	6,6,6	0.60	0
2	SO4	B	301	-	4,4,4	0.67	0	6,6,6	0.91	0
2	SO4	E	301	-	4,4,4	0.47	0	6,6,6	0.56	0
2	SO4	F	301	-	4,4,4	0.80	0	6,6,6	0.58	0
2	SO4	B	302	-	4,4,4	0.89	0	6,6,6	0.84	0
2	SO4	D	301	-	4,4,4	0.47	0	6,6,6	0.72	0
2	SO4	I	302	-	4,4,4	0.36	0	6,6,6	0.27	0
2	SO4	B	304	-	4,4,4	0.43	0	6,6,6	0.53	0
2	SO4	B	303	-	4,4,4	0.37	0	6,6,6	0.43	0
2	SO4	D	303	-	4,4,4	0.42	0	6,6,6	0.42	0
2	SO4	F	303	-	4,4,4	0.42	0	6,6,6	0.47	0
2	SO4	L	302	-	4,4,4	0.36	0	6,6,6	0.26	0
2	SO4	F	302	-	4,4,4	0.63	0	6,6,6	0.57	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	L	301	SO4	2	0
2	B	301	SO4	1	0
2	I	302	SO4	1	0
2	D	303	SO4	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	224/226 (99%)	0.21	9 (4%) 38 15	53, 79, 114, 155	2 (0%)
1	B	226/226 (100%)	-0.46	0 100 100	26, 39, 61, 91	3 (1%)
1	C	226/226 (100%)	-0.20	0 100 100	44, 62, 91, 127	3 (1%)
1	D	226/226 (100%)	-0.40	0 100 100	40, 49, 73, 97	3 (1%)
1	E	226/226 (100%)	-0.35	0 100 100	47, 54, 76, 101	3 (1%)
1	F	226/226 (100%)	-0.52	1 (0%) 92 79	28, 39, 67, 120	3 (1%)
1	G	226/226 (100%)	-0.46	1 (0%) 92 79	35, 44, 81, 149	3 (1%)
1	H	221/226 (97%)	-0.05	4 (1%) 68 40	57, 75, 114, 173	3 (1%)
1	I	226/226 (100%)	-0.44	0 100 100	34, 46, 77, 117	3 (1%)
1	J	226/226 (100%)	-0.18	2 (0%) 84 63	58, 69, 103, 151	3 (1%)
1	K	226/226 (100%)	0.40	7 (3%) 49 21	87, 115, 202, 314	3 (1%)
1	L	226/226 (100%)	0.64	20 (8%) 10 3	71, 102, 152, 183	3 (1%)
All	All	2705/2712 (99%)	-0.15	44 (1%) 72 44	26, 62, 129, 314	35 (1%)

The worst 5 of 44 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	L	216	LYS	5.9
1	L	241	LEU	5.6
1	L	169	ARG	5.4
1	A	218	GLY	4.7
1	J	241	LEU	4.7

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	SO4	L	302	5/5	0.65	0.41	132,140,145,147	0
2	SO4	L	301	5/5	0.83	0.30	87,87,88,92	0
2	SO4	B	304	5/5	0.89	0.20	69,71,75,78	0
2	SO4	D	302	5/5	0.93	0.17	72,76,79,80	0
2	SO4	F	303	5/5	0.93	0.23	77,81,82,85	0
3	CL	C	301	1/1	0.93	0.31	54,54,54,54	0
2	SO4	B	303	5/5	0.95	0.17	82,83,87,88	0
2	SO4	D	303	5/5	0.95	0.18	66,67,67,68	0
3	CL	I	303	1/1	0.95	0.10	44,44,44,44	0
2	SO4	I	301	5/5	0.95	0.18	67,69,70,73	0
2	SO4	E	301	5/5	0.95	0.27	65,66,68,71	0
3	CL	D	304	1/1	0.96	0.19	48,48,48,48	0
2	SO4	B	301	5/5	0.96	0.14	34,34,36,37	0
2	SO4	I	302	5/5	0.96	0.12	68,69,71,75	0
2	SO4	D	301	5/5	0.97	0.16	46,48,49,50	0
2	SO4	F	301	5/5	0.98	0.13	35,36,37,38	0
2	SO4	B	302	5/5	0.98	0.10	32,33,35,36	0
2	SO4	F	302	5/5	0.98	0.12	43,44,46,47	0

6.5 Other polymers [i](#)

There are no such residues in this entry.